ENHANCED $SrSi_2O_2N_2$ PHOTOLUMINESCENCE PROPERTIES BY OPTIMIZATION OF SYNTHESIS METHOD.

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Oxynitride yellow-green emitting $Sr_{0,96}Si_2O_2N_2:Eu_{0,04}^{2+}$ phosphors were obtained via solid state reaction method with 3 – 9 wt% of Na_2CO_3 flux addition or gas pressure method. Reference material without fluxing agent was obtained via solid state reaction too.

Single-phase composition of obtained materials was confirmed by XRD analysis. In order to determine the local environment of the Eu^{2+} ions in the structure X-ray absorption near-edge spectroscopy (XANES) was performed. Optical measurements confirmed that all of the excitation spectra covers UV radiation to blue light spectral region and are characterized by emission with single maximum in 540 nm. It was proved that performing synthesis via high pressure assistance method without nitrogen flow atmosphere will stabilize process. It was also confirmed, that usage of flux lead to formation of reactive liquid phase which results in enhanced crystallization of oxynitride phase – 5 wt% of Na_2CO_3 flux addition was found to be an optimum concentration. Enhanced photoluminescence properties were observed in both cases: quantum efficiency and luminous efficacy are improved in comparison to the reference material, as well as thermal stability measured in the range 0 - 225°C.